Is DAFit or ConFit better choice for analysis of NuMI Target?

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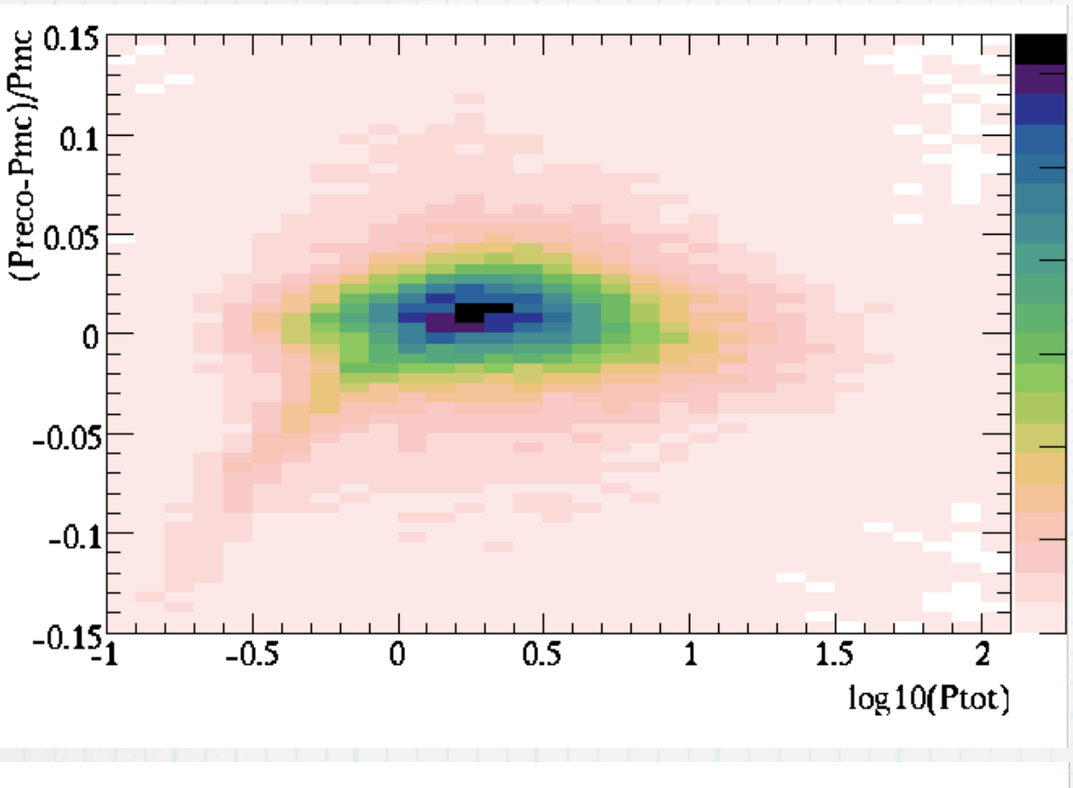
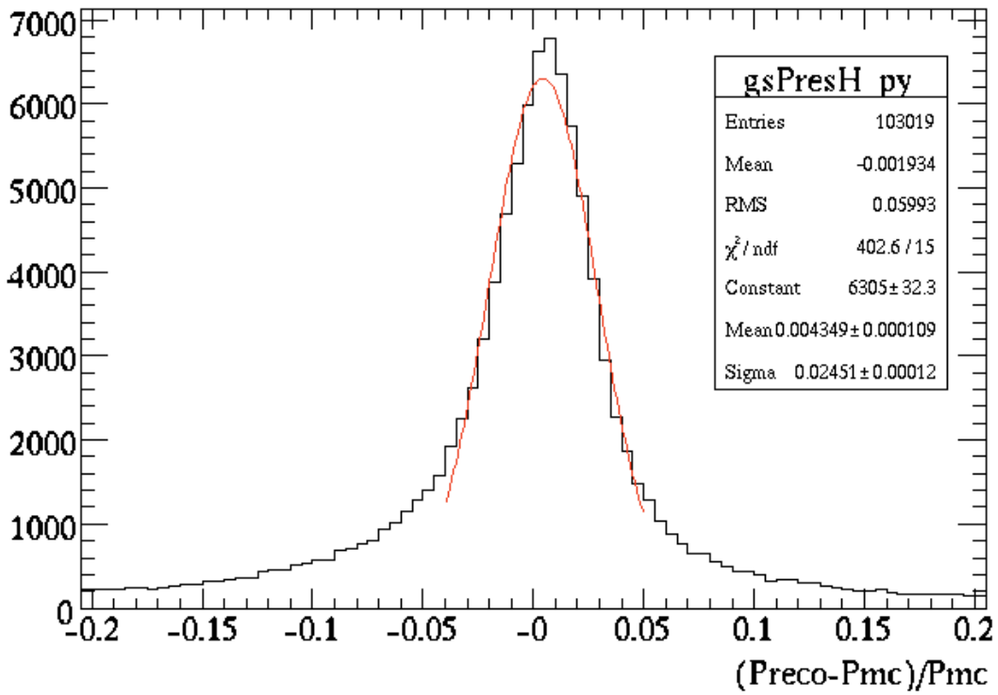
* Issue:
  * Tracks are initially fit independently from one another.
  * DAFit groups tracks together that are likely to share a common vertex, but does not refit the track parameters after forming a vertex.
  * ConFit takes the vertices formed by DAFit and refits all the track parameters using a vertex constraint.
  * For NuMI target, which is very long and potentially contains multiple vertices, it is not clear which set of track parameters will yield best results. There is likely to be some ambiguity about which vertex a track really belongs to possibly biasing the momentum fit results from ConFit.
* Method:
  * I reconstructed 10,000 NuMI MC events through bpMC_Job.xml and compared the resolutions for the total momentum and transverse momentum for all tracks in events with multiplicities of 3 or higher.
* Result:
  * DAFit and ConFit give almost same resolution for total momentum
  * ConFit is significantly better for transverse component
  * **Use ConFit**

Total Momentum Resolutions

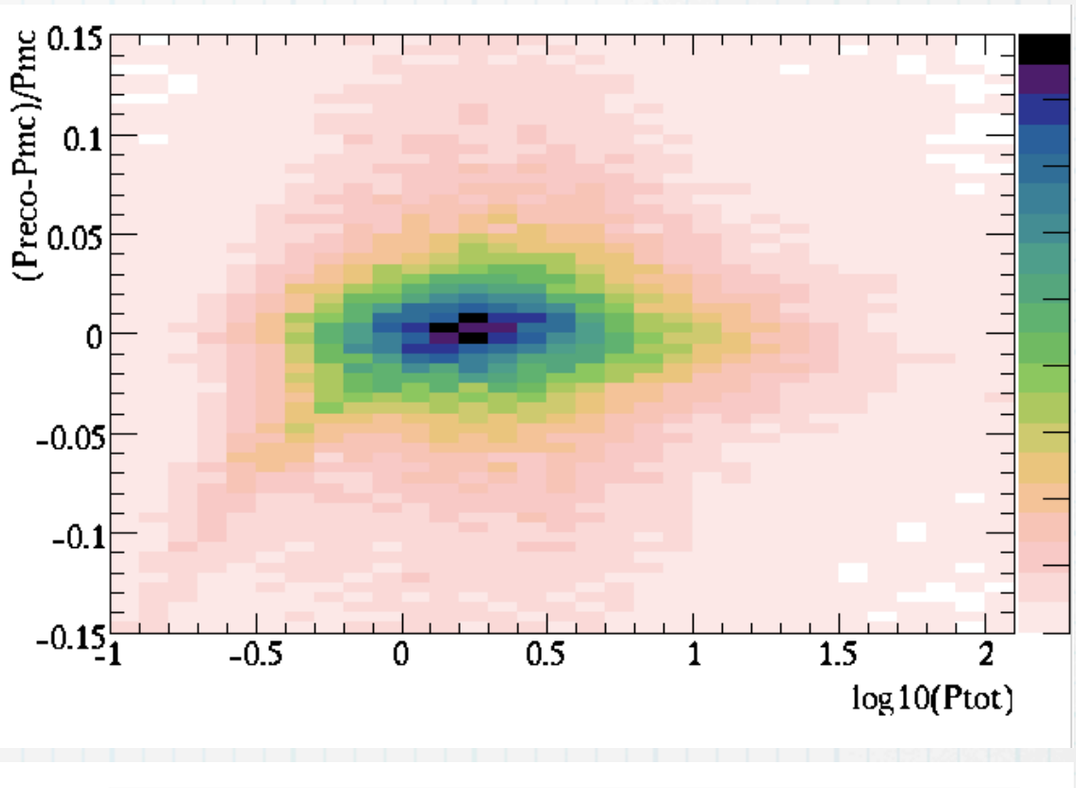
DAFit

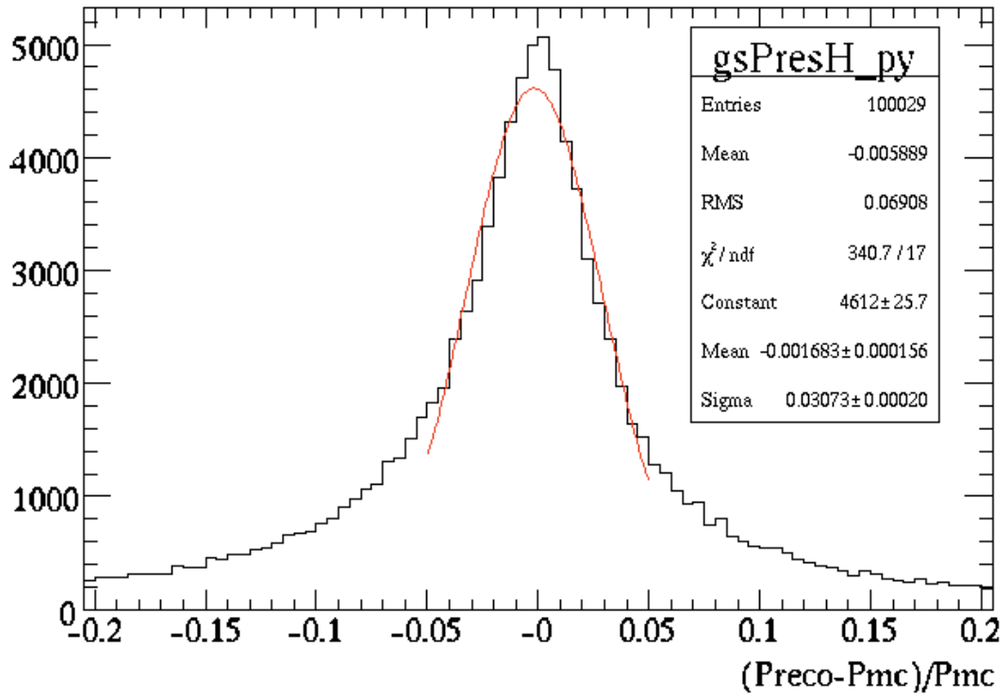




Typically 2.5% resolution

ConFit

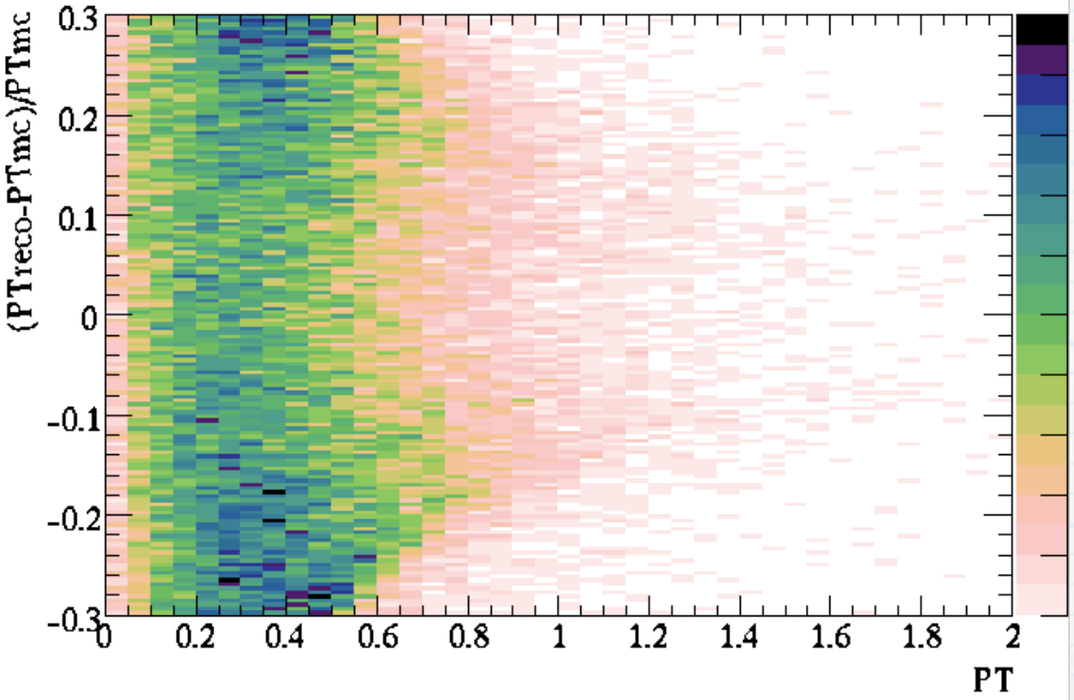


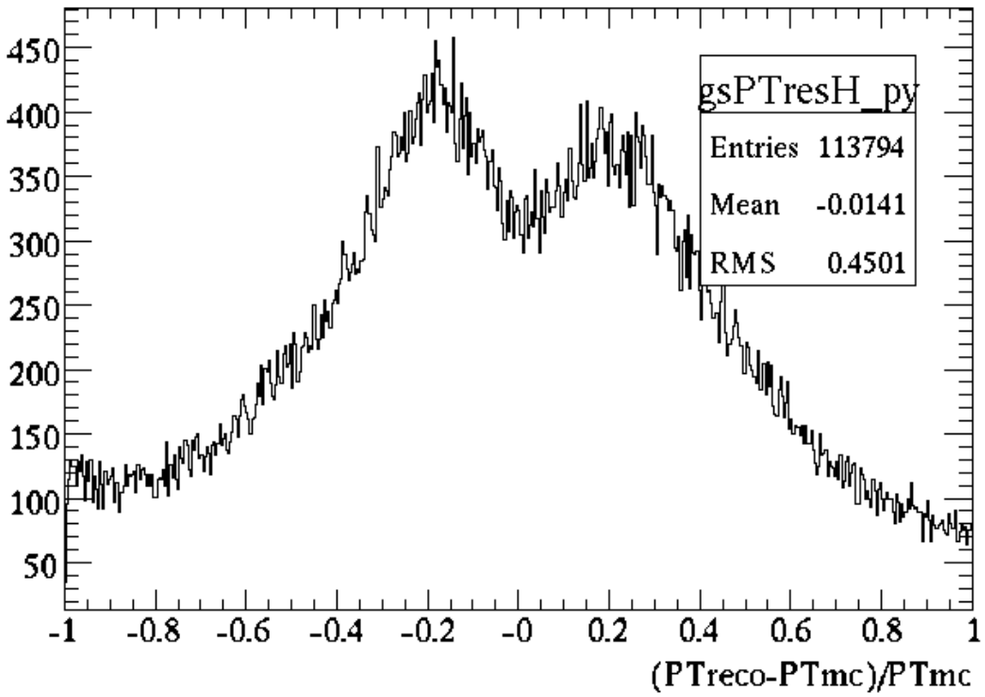


Typically 3.1% resolution

Transverse Momentum Resolutions

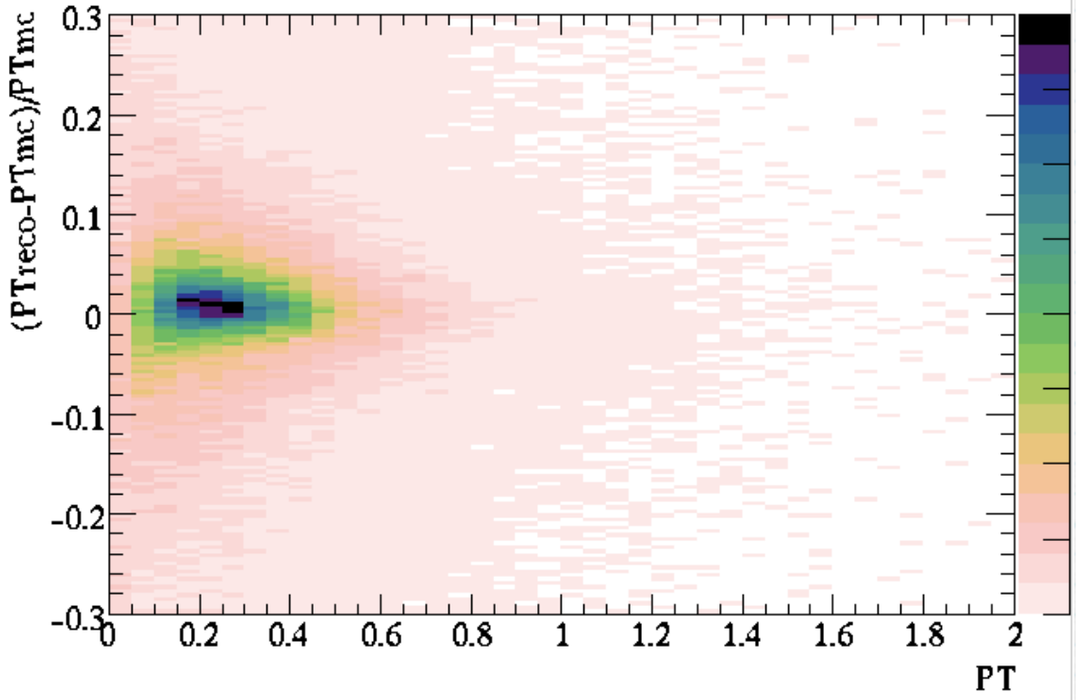
DAFit

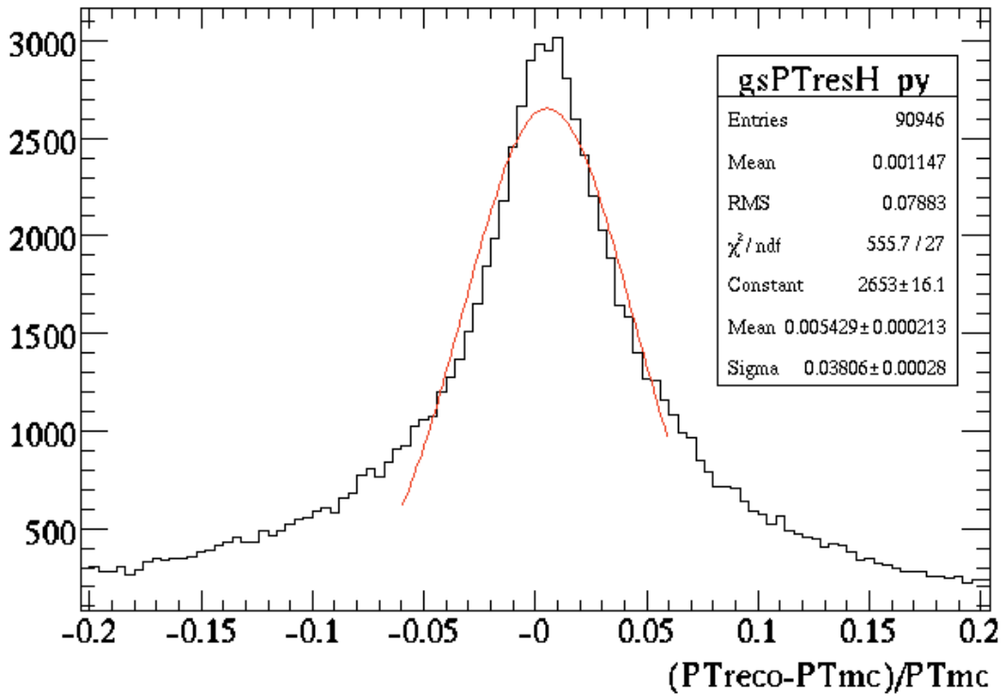




Weird double-peak structure

ConFit





Typically 3.8% resolution